ISSN 0103-6076

GOELDIANA
Zoologia

Número 11

New Data on the Distribution of Primates in the Region of the Confluence of the Jiparaná and Madeira Rivers in Amazonas and Rondônia, Brazil

Stephen F. Ferrari &
Maria Aparecida Lopes

Número 12

A New Species of Marmoset, Genus *Callithrix* Erxleben, 1777 (Callitrichidae, Primates), from Western Brazilian Amazonia

Stephen F. Ferrari &
Maria Aparecida Lopes

31 de janeiro de 1992

Goeldiana Zoologia
Número 11: 31 de janeiro de 1992

New Data on the Distribution of Primates in the Region of the Confluence of the Jiparaná and Madeira Rivers in Amazonas and Rondônia, Brazil

Stephen F. Ferrari [1 2]
Maria Aparecida Lopes [1 3]

ABSTRACT — Data on the distribution of primates in the region of the confluence of the Jiparaná and Madeira Rivers in western Brazilian Amazonia are presented. New localities are recorded for a number of species, in addition to range extensions for both *Callicebus moloch* and *Saguinus fuscicollis weddelli*. These findings, along with information given by local residents on the distribution of other species indicate that the Jiparaná River plays a significant role in the zoogeography of the primates of the region.

KEY WORDS — primates, distribution, *Callicebus moloch*, *Saguinus fuscicollis weddelli*, Madeira River, Jiparaná River.

RESUMO — Dados sobre a distribuição de primatas na região da confluência dos rios Jiparaná e Madeira na Amazônia ocidental brasileira são apresentados. Localidades novas são registradas para várias espécies, e ampliações significativas das distribuições de *Callicebus moloch* e *Saguinus fuscicollis weddelli* são indicadas. Esses resultados, junto às informações cedidas por moradores sobre a distribuição de outras espécies, indicam que o Rio Jiparaná exerce um papel importante na zoogeografia dos primatas da região.

PALAVRAS-CHAVE — primatas, distribuição, *Callicebus moloch*, *Saguinus fuscicollis weddelli*, Rio Madeira, Rio Jiparaná.

---

[1] Museu Paraense Emílio Goeldi — CNPq, Departamento de Zoologia, C.P. 399, CEP 66.040 Belém, Pará, Brasil.

[2] Bolsista de Desenvolvimento Científico Regional — CNPq.

[3] Bolsista de Mestrado — CNPq.

INTRODUCTION

While undoubtedly at least as well documented as other areas of the upper Amazon, the Madeira River basin is still relatively poorly known with regards to primate distributions (see de Vivo 1985). This is exemplified by the recent discovery of the saddle-back tamarin, *Saguinus fuscicollis weddelli*, on the right or east bank of the river (de Vivo 1985, Martins *et al.* 1987) when its geographical range had previously been restricted to the west bank (Hershkovitz 1977).

With this in mind, the principal aim of the present study was the collection of information on the distribution of primates, in particular *S. f. weddelli* and titi monkeys (*Callicebus* spp.), in the region of the confluence of the Jiparaná and Madeira Rivers in the Brazilian states of Amazonas and Rondônia. Range extensions for both *S. f. weddelli* and *Callicebus moloch* are reported, and the results of the study show that the Jiparaná plays an important role in the zoogeography of these and at least three other primate taxa.

METHODS

Five sites in the Jiparaná/Madeira region (Fig. 1) were visited for periods of one to six days between 31 Aug and 22 Sep 1990. Data on the occurrence of primates at each site were compiled through a combination of specimen collection, direct observation and interviews with local residents. Interviews followed a format, developed in a previous study (Ferrari & Lopes Ferrari 1990), designed to avoid direct prompting and increase the accuracy of the information collected. Nevertheless, such information was always corroborated, as far as possible, through the collection of field data.

With the assistance of local residents, where available, existing trails in forest habitats at each site were utilized for the collection of observational records and specimens. Time in the field is given as "field days", according to the division of personnel (the survey of two different areas at the same site on the same day by two different researchers is counted as two field days). The identification of specimens was carried out through reference to available literature and comparisons with material in the zoological collection of the Goeldi Museum. The specimens collected were also deposited at the Goeldi Museum, representing the series MPEG 21990 - MPEG 22013.

RESULTS

Site 1. Right bank of Madeira River opposite Humaitá, Amazonas (7°31'S, 63°52'W).
Habitat: disturbed *terra firme* forest (logging).
Duration: One field day.
Observations: *Cebus apella, Nasua nasua, Sciurus spadiceus.*
Specimens collected: *Saimiri madeirae* (sensu Thorington 1985), adult male (MPEG 21993), juvenile female (MPEG 21992).

Site 2. Lago dos Reis, Amazonas, km 17 on BR-230 Humaitá-Itaituba (7°32'S, 62°52'W).
Habitat: secondary and disturbed *terra firme* forest (logging, agriculture and cattle ranching).
Duration: Six field days.
Interviews: absence of *Alouatta* and *Saguinus* reported. Presence of *Ateles, Aotus, Chiropotes* and *Lagothrix* indicated.
Observations: absence of both *Alouatta* and *Saguinus* confirmed.
Specimens collected: *Callithrix nigriceps*, three adult males (MPEG 21996, MPEG 21998, MPEG 21999); *Saimiri madeirae*, two adult males (MPEG 21990, MPEG 21991); *Callicebus moloch*, adult female (MPEG 22000); *Pithecia irrorata*, adult male (MPEG 22001).

Site 3. Training reserve of the 54th Rain Forest Infantry Battalion (54° BIS), Humaitá, Amazonas, km 20 on BR-230 Humaitá - Lábrea (7°33'S, 63°12'W).
Habitat: slightly disturbed *terra firme* forest (army training).
Duration: Two field days.
Observations: *Mustela* cf. *africana*. Mammals rare.
Specimen collected: *Saguinus labiatus labiatus*, adult female (MPEG 22002).

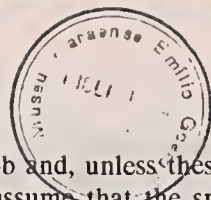
Site 4a. Left bank of the Jiparaná River at Calama, Rondônia (8°05'S, 62°53'W).
Habitat: undisturbed *terra firme* forest bordering agricultural land.
Duration: Two field days.
Interview: *Alouatta, Cebus albifrons, Chiropotes* and *Lagothrix* reported as being absent. *Alouatta* reported to occur on west bank of Madeira, *Chiropotes* on east bank of Jiparaná only. Presence of *Aotus* and *Callithrix* indicated. Absence of primates on islands in the Jiparaná subject to seasonal flooding.
Observations: *Ateles paniscus, Pithecia irrorata, Saimiri* observed. Absence of *Alouatta* confirmed. Primates abundant.
Specimens collected: *Cebus apella*, adult female (MPEG 22004), infant male (MPEG 22005), *Saguinus fuscicollis weddelli*, adult female (MPEG 22003); *Callicebus brunneus*, adult female (MPEG 22006).

Site 4b. Right bank of the Jiparaná River at Calama, Rondônia (8°03'S, 62°53'W).
Habitat: Secondary and disturbed *terra firme* forest (logging, agriculture and cattle ranching).
Duration: Four field days.
Interviews: *Alouatta* absent, but reported to occur on west bank of Madeira. Some reports of *Saguinus*. Presence of *Aotus, Ateles, Cebus, Chiropotes, Lagothrix* and *Pithecia* indicated.
Observations: Absence of *Alouatta* and *Saguinus* confirmed. Mammals rare.
Specimens collected: *Saimiri madeirae*, adult male (MPEG 21995), adult female (MPEG 21994); *Callicebus moloch*, adult male (MPEG 22007); *Callithrix nigriceps*, adult female (MPEG 21997); *Tamandua tetradactyla*, adult female (MPEG 22008).

Site 5. Ipixuna River, Amazonas, km 41 on BR-230 Humaitá-Lábrea (7°31'S, 63°22'W).
Habitat: secondary, disturbed and undisturbed *terra firme* forest (agriculture); igapó forest.
Duration: seven field days.
Interviews: presence of *Alouatta, Aotus, Ateles, Cebus albifrons* and *Pithecia* indicated. *Alouatta* reported to be restricted to igapó habitats and/or areas from which *Lagothrix* is absent. Occurrence of different forms of *Saimiri* in *terra firme* and igapó habitats also indicated.
Observations: *Lagothrix lagothrica, Saimiri* sp. (local pet = *S. madeirae*), *Eira barbara, Felis yagouaroundi, Felis pardalis, Mazama americana, Sciurus spadiceus, Sciurus* sp. Mixed groups of *S. f. weddelli* and *S.l. labiatus* were observed on both banks of the Ipixuna. *Alouatta* vocalizations heard, hunted *A. seniculus* seen.
Specimens collected: *Callicebus caligatus*, adult male (MPEG 22012), adult female (MPEG 22011); *Cebus apella*, adult female (MPEG 22013); *Saguinus fuscicollis weddelli*, adult male (MPEG 22010); *Saguinus labiatus labiatus*, adult female (MPEG 22009).

DISCUSSION

Distribution of *Callicebus*

In his 1988 and 1990 reviews, Hershkovitz identifies the region between the Aripuanã and Madeira Rivers as a lacuna in the distribution of the genus *Callicebus* (Hershkovitz 1990: Fig. 1, p.4). The evidence from the present study indicates, on the contrary, that the geographical range of *C. moloch* extends as far west as the confluence of the Jiparaná and Madeira and suggests that the Aripuanã does not play a significant role in the distribution of the species.

C. moloch was apparently common at sites 2 and 4b and, unless these are seen as isolated populations, it seems reasonable to assume that the species occurs throughout the area between the Aripuanã and the Madeira, wherever suitable habitat is available. The absence of records of the genus from this area remains equivocal for a number of reasons, not least because of the obvious nature of *C. moloch* duetting and the species' preference for riverbank habitats (Kinzey 1981).

The collection of *C. brunneus* from the left bank of the Jiparaná (site 4a) and *C. caligatus* from the Ipixuna River (= left bank of the Madeira) is in agreement with Hershkovitz (1988, 1990). The confluence of the Jiparaná and Madeira Rivers thus forms a division between the geographical ranges of three of the eight species of the *C. moloch* group (sensu Hershkovitz 1988, 1990).

Distribution of *Saguinus fuscicollis weddelli*

The most widely distributed of tamarin species, *S. fuscicollis* occurs throughout much of the upper Amazon basin (Hershkovitz 1977: Fig. X.24, p. 636). The eastern limits of the species's range are poorly defined, with a lack of information from the region between the lower inter-Madeira-Purús basin (Hershkovitz 1977) and recent observations of *S. f. weddelli* east of the Madeira river in Rondônia (de Vivo 1985, Martins *et al.* 1987).

In his Figure X.24, Hershkovitz (1977) postulates that the Ipixuna River is the eastern limit of the range of *S. f. weddelli*. In addition to being the major tributary between the lower Madeira and Purús, the upper reaches of the Ipixuna make contact with a large area of cerrado and campo vegetation to the south and west of Humaitá. The combination of these features could form an effective barrier for the dispersion of small arboreal primates such as tamarins, although observations of *S. f. weddelli* on both banks of the Ipixuna River indicate that its distribution extends farther east.

S. f. weddelli was twice observed at close quarters on the right bank of the Ipixuna and there was little doubt as to the taxon, especially as the characteristic whitish band above the eyes clearly distinguishes this subspecies from the only other on the lower Purús, *S. f. avilapiresi*. The extent to which the range of *S. f. weddelli* extends eastward into the lower inter-Madeira-Purús remains unclear (Fig. 2), despite its proximity to Manaus.

Data collected on the Jiparaná River are more definitive. *S. f. weddelli* was collected on the west bank, where it appears to be a member of a primate community equivalent to that recorded farther west at Samuel (Fig. 1; Schneider et al. 1990). *Saguinus* does not appear to occur to the east of the Jiparaná. Unless it is both very rare and ecologically distinct from its conspecifics, the field data leave little doubt as to the absence of a *S. fuscicollis* population east of the Jiparaná. At Samuel, *S. f. weddelli* is one of the most conspicuous primates, especially at forest edges, and is commonly seen in mixed troops with

Callithrix emiliae (Martins *et al.* 1987, Lopes and Ferrari, in prep.). Despite numerous sightings of *C. nigriceps* in edge and disturbed forest habitats during eleven field days at sites 1, 2 and 4b, tamarins were not observed in this region.

With the data from the present study, the range of *S. f. weddelli* can be extended farther eastward on both banks of the Madeira (Fig. 3), but more information will be needed before the northern and southern limits of this range extension can be defined.

Distribution of other primates in the region and the zoogeographical role of the Jiparaná River.

According to the data collected, the primate community on the left bank of the Jiparaná River at Calama (site 4a) appears to be the same as that at Samuel, some 100 km to the southwest, as might be expected from the lack of any major geographical barriers between the two sites. In addition to *C. brunneus* and *S. fuscicollis*, six species were recorded at Samuel (*Aotus azarae, Ateles paniscus, Callithrix emiliae, Cebus apella, Pithecia irrorata* and *Saimiri madeirae*: Schneider *et al.* 1990).

The absence of *Chiropotes albinasus* from both sites contradicts Hershkovitz (1984a: Fig. 1, p. 2), who defines the Guaporé River as the southwestern limit of this species' range. An experienced local hunter was categorical in restricting the distribution of *C. albinasus* east of the Jiparaná, on the contrary, and there are in fact no collecting records from Rondônia west of this river (Allen 1916, de Vivo 1985, Schneider et al. 1990). Hershkovitz's interpretation appears to be based on the erroneous placement of the Jaru Biological Reserve west of the Jiparaná (1984a: locality 53a, Fig. 2, p. 3) when it is in fact located on the right or east bank. The available evidence indicates, then, that the eastern limit of the geographical distribution of *Chiropotes albinasus*, as that of *Callicebus moloch*, is defined by the Jiparaná/Madeira Rivers and not the Guaporé.

The apparent absence of *Alouatta*, the most widely-distributed of all platyrrhine genera, from all but one of the sites raises a number of questions, given that these primates are found in a wide range of habitats types and "are often the only monkeys left in areas used by humans" (Neville et al. 1988: p. 363). Hill (1962: Map 1, pp. 136-137) identifies the Jiparaná/Madeira as the western limit of the geographical range of the *Alouatta belzebul*, but lacked information on the distribution of the genus in the remainder of Rondônia. A specimen of *A. seniculus* (MPEG 19707) was collected in Rondônia at Alvorada do Oeste, 300 km south of Samuel and to the west of the Jiparaná, and this species was observed at the Ipixuna River site. Bonvicino *et al.* (1989) record *A. belzebul* from both banks of the lower Madeira. Hence, the distribution of *Alouatta* in this region and the variables determining distribution patterns undoubtedly deserve further study.

Specimens of two other primates collected during the present study lend additional emphasis to the zoogeographical role of the Jiparaná. The lower Jiparaná appears to separate the geographical ranges of *C. emiliae* and the newly-described *Callithrix nigriceps* Ferrari and Lopes 1992. According to collecting localities at Rio Castanho and Nova Brasília (de Vivo 1985), *C. emiliae* does occur east of the Jiparaná, however, and Ferrari and Lopes (1992) suggest that the eastern limit of the range of *C. nigriceps* may be Rio dos Marmelos. More information will be needed before this situation can be defined.

Humaitá is the type locality for *Saimiri madeirae* Thomas 1908, and all the specimens collected agree with descriptions of this species (Thorington 1985). Squirrel monkeys from Samuel agree with Hershkovitz's (1984b) description of *Saimiri ustus*, on the other hand. The difference is most striking in the case of the preauricular patch, which in "*Saimiri ustus* ... [is] consistently eumelanized in females ... in most males [sexual dichromatism] is heightened by dilution of the eumelanin of the agouti..." (Hershkovitz 1984b: 162). Specimens from Samuel in the Goeldi Museum collection agree with this description, while those collected on the east bank of the Jiparaná/Madeira at sites 1, 2 and 4b exhibit a creamy white preauricular patch, sharply contrasting with the agouti of the crown, in both sexes. There is also a marked difference in the coloration of the forelimbs. In specimens from Samuel, both the hand and the fore-arm are yellow, while in those collected during this present study, yellow is restricted to the hands.

Far from resolving squirrel monkey taxonomy, the two most recent reviews (Hershkovitz 1984b, Thorington 1985) have stimulated further controversy, exacerbated by both the discovery of a new form (Ayres 1985) and a growing body of evidence on taxonomic relationships between the different forms (Silva 1990, Silva Jr., in prep.). Thus, while the Jiparaná may constitute an effective barrier between two parapatric forms of squirrel monkey, it remains unclear whether these forms should be seen as species, subspecies or geographical races.

Overall, then, the results of the present study indicate that the Jiparaná River is an important geographical barrier for a number of primate genera. Additional data on other taxa may further reinforce this view. The recent discovery of *Aotus azarae* at Samuel (Schneider et al. 1990), for example, confirms that the distribution of this species extends farther northwards than it was possible to ascertain with the evidence available previously (Hershkovitz 1983). The Jiparaná is the only major river which lies between Samuel and the Roosevelt River, nearest known locality of *Aotus nigriceps* (Hershkovitz 1983). The collection of more detailed information on the distribution of these and other primates (*Alouatta, Ateles, Cebus, Pithecia* and *Lagothrix*) in this region would help to resolve a number of important questions.

Primate conservation in the study area

In common with much of the Amazon Basin (e.g., Fearnside 1990), the construction of highways and subsequent colonization have had deleterious effects for the flora and fauna of the study area. Selective logging and forest clearance for agricultural plots and cattle grazing have created a typical mosaic of disturbed and secondary forest habitats at three of the four sites visited along the Trans-Amazon Highway (sites 1, 2 and 5), as well as in the vicinity of the village of Calama (site 4b), which is easily accessible from Porto Velho by the Madeira River.

Site 3 is an exception, presenting a large area (approximately 10,000 ha) of relatively undisturbed forest bordering the Trans-Amazon highway. While the forest is relatively well preserved, Army training (which including hunting as a survival tactic) appears to have had a devastating effect on the vertebrate fauna. The only primates observed were a group of *S.l. labiatus*, although a group of four weasels, *Mustela cf. africana*, was also encountered.

While fish was the main source of protein for local residents at all the sites visited, hunting with shotguns is common practice. As in other regions of Brazilian Amazonia (Redford & Robinson 1987), medium or large primates such as *Alouatta, Ateles, Cebus, Chiropotes* and *Lagothrix* were generally among the preferred and/or most frequently cited game animals. This preference was reflected in the apparently low densities of these primates at most sites. In addition to being unattractive as game, habitat disturbance has favored the smaller forms such as the callitrichids, squirrel monkeys and titis, which were relatively abundant at most sites.

Despite hunting pressures, large mammals appeared to be relatively abundant at the Ipixuna River site (see results). At 2 km west of the community, for example, a group of more than twenty woolly monkeys, *L. lagothrica*, was encountered in the forest edge bordering the Trans-Amazon Highway, even though these large primates are among the most vulnerable to hunting (Peres 1990a) and may actively avoid sites of human activity such as roads at other sites (Peres 1990b).

Figure 1. Map of localities mentioned in the text. 1: East bank of Madeira River opposite Humaitá, AM. (7°31'S, 63°02'W); 2: Lago dos Reis, AM, km 17 on BR-230 Humaitá-Itaituba (7°32'S, 62°52'W); Training reserve of the 54th Jungle Infantry Battalion, Humaitá, AM, km 20 on BR-230 Humaitá-Lábrea (7°33'S, 63°12'W); 4a: West bank of the Jiparaná River at Calama, RO (8°05'S, 62°55'W); 4b: East bank of the Jiparaná River at Calama, RO (8°03'S, 62°53'W); 5: Ipixuna River, AM, km 41 on BR-230 Humaitá-Lábrea (7°31'S, 63°22'W).

Figure 2. Distribution of *Saguinus fuscicollis weddelli*.

ACKNOWLEDGEMENTS

Field work was financed by the John D. and Catherine T. MacArthur Foundation and data analysis supported by the CNPq. Specimen collection was authorized by IBAMA (special license 1404/90-31). We are especially grateful to Dionísio Pimentel Neto and Fernando Cazarini (Director of Projeto Rondon-Humaitá) for their conscientious assistance in the field. We would also like to thank David C. Oren, Mário de Vivo, João de Paiva, Cazuza Júnior, Alexandra Krause and all those who offered their help in the field, especially Capt. Pinheiro of the 54° BIS.

REFERENCES

ALLEN, J.A. 1916. Mammals collected on the Roosevelt Brazilian expedition, with field notes by Leo E. Miller. *Bull. Am. Mus. Nat. Hist.*, 35: 559-610.

AYRES, J.M.C. 1985. On a new species of squirrel monkey, genus *Saimiri*, from Brazilian Amazonia (Primates, Cebidae). *Pap. Avulsos Zool., São Paulo* 36: 147-164.

BONVICINO, C.R., LANGGUTH, A. & MITTERMEIER, R.A. 1989. A study for a pelage color and geographic distribution of *Alouatta belzebul* (Primates: Cebidae). *Rev. Nord. Biol.* 6: 139-148.

FEARNSIDE, P.M. 1990. Rondônia: Estradas que levam à devastação. *Ciência Hoje* 11: 46-52.

FERRARI, S.F. & LOPES FERRARI, M.A. 1990. A survey of primates in central Pará. *Bol. Mus. Para. Emílio Goeldi, sér. Zool.* 6:169-180

FERRARI, S.F. & LOPES, M.A. 1992. A new species of marmoset, genus *Callithrix* Erxleben, 1777 (Callitrichidae, Primates), from western Brazilian Amazonia. *Goeldiana Zool.* 12: 1-13.

HERSHKOVITZ, P. 1977. *Living New World Monkeys*, v.1., University of Chicago Press, Chicago. xiv + 1117 p.

HERSHKOVITZ, P. 1983. Two new species of night monkeys, genus *Aotus* (Cebidae, Platyrrhini): a preliminary report on *Aotus* taxonomy. *Am. J. Primatol.* 4: 209-243.

HERSHKOVITZ, P. 1984a. A preliminary taxonomic review of the South American bearded saki monkeys, genus *Chiropotes* (Cebidae, Platyrrhini), with the description of a new subpecies. *Fieldiana, Zool.* 27.

HERSHKOVITZ, P. 1984b. Taxonomy of squirrel monkeys genus *Saimiri* (Cebidae, Platyrrhini): A preliminary report wilh description of a hilherto unnamed form. *Am. J. Primatol.* 7: 155-210.

HERSHKOVITZ, P. 1988. Origin, specialion and dislribulion of Soulh American titi monkeys, genus *Callicebus* (Family Cebidae, Platyrrhini). *Proc. Acad. Nat. Sci. Philadel.* 140: 240-272.

HERSHKOVITZ, P. 1990. Titis, New World monkeys of the genus *Callicebus* (Cebidae, Platyrrhini): A preliminary taxonomic review. *Fieldiana, Zool.* 55.

HILL, W.C.O. 1962. *Primates: comparative anatomy and taxonomy*, v.4., pt. B., Edinburgh, Edinburgh University Press.

KINZEY, W.G. 1981. The titi monkeys, genus *Callicebus*. In: Mittermeier, R.A. & Coimbra-Filho, A.F. (eds.) *Ecology and behaviour of Neotropical primates*, v. 1., Rio de Janeiro, Academia Brasileira de Ciências. p.241-276.

MARTINS, E.S., SCHNEIDER, H. & LEÃO, V.F. 1987. Syntopy and troops association between *Callithrix* and *Saguinus* from Rondônia, Brazil. *Int. J. Primatol.* 8: 527.

NEVILLE, M.K., GLANDER, K.E., BRAZA, F. & RYLANDS, A.B. 1988. The howling monkeys, genus *Alouatta*. In: Mittermeier, R.A., Rylands, A.B., Coimbra-Filho, A.F. & Bouchardet da Fonseca, G.A. (eds.) *Ecology and behavior of Neotropical primates*, v. 2., Washington, World Wildlife Fund. p.349-453.

PERES, C.A. 1990a. Effects of hunting in western Amazonia primate communities. *Biol. Conserv.* 54:47-59.

PERES, C.A. 1990b. Primate conservation and oil extraction in Central Amazonia. *Primate Eye* 41: 16-20.

REDFORD, K. & ROBINSON, J.G. 1987. A game of choice: Patterns of Indian and colonist hunting in the Neotropics. *Am. Anthropol.* 89: 650-667.

SCHNEIDER, H., MARTINS, E.S., SAMPAIO, M.I., BAMPI, M.I., VALÉRIO, C.B., JURAS, I. A.G.M. & GHILARDI, R. Jr. 1990. *Relatório da Operação Jamari.* Unpubl. report to Eletronorte, S.A.

SILVA, B.T.F. 1990. Variabilidade protéica e diferenciação evolutiva no gênero *Saimiri*. Unpubl. M.Sc. dissertation. Porto Alegre, Federal University of Rio Grande do Sul.

THORINGTON, R.W. Jr. 1985. The taxonomy and distribution of squirrel monkeys (Saimiri). In: Rosenblum, L.A. & Coe, C.L. (eds.) *Handbook of squirrel monkey research* . New York, Plenum Press. p.1-33.

de VIVO, M. 1985. On some monkeys from Rondônia, Brasil (Primates: Callitrichidae, Cebidae). *Pap. Avulsos. Zool., São Paulo*, 36: 103-110.

de VIVO, M. 1988. Sistemática de *Callithrix* Exrleben, 1777 (Callitrichidae, Primates). Ph.D. thesis, São Paulo, University of São Paulo.

Goeldiana Zoologia
Número 12: 31 de janeiro de 1992

A New Species of Marmoset, Genus *Callithrix* Erxleben, 1777 (Callitrichidae, Primates), from Western Brazilian Amazonia

Stephen F. Ferrari [1 2]
Maria Aparecida Lopes [1 3]

ABSTRACT — The blacked-headed marmoset *Callithrix nigriceps*, sp.n., from the Lago dos Reis, municipality of Humaitá, Amazonas, Brazil, is described. A comparison with other bare-eared marmosets is presented. The limits of the new species's distribution are discussed in relation to those of other callitrichids. Notes on the conservation status of the new species are also presented.

KEY WORDS: *Callithrix nigriceps*, sp.n., primates, Callitrichidae, marmoset, Brazilian Amazonia.

RESUMO — Descreve-se o sagüi-de-cabeça-preta *Callithrix nigriceps*, sp.n., proveniente do Lago dos Reis, município de Humaitá, Amazonas, Brasil. Uma comparação com outros sagüis de orelha nua é apresentada. Os limites da distribuição da nova espécie são discutidos em relação àqueles de outros calitriquídeos. Algumas notas sobre o estado de conservação da nova espécie também são apresentadas.

PALAVRAS-CHAVE: *Callithrix nigriceps*, sp.n., primates, Callitrichidae, sagüi, Amazônia brasileira.

---

[1] Museu Paraense Emílio Goeldi — CNPq, Departamento de Zoologia, C.P. 399, CEP 66.040 Belém, Pará, Brasil.

[2] Bolsista de Desenvolvimento Científico Regional — CNPq.

[3] Bolsista de Mestrado — CNPq.

INTRODUCTION

The taxonomy of the marmosets, genus *Callithrix* Erxleben 1777, has undergone two major revisions during the past fifteen years (Hershkovitz, 1977; de Vivo, 1988). Hershkovitz (1977) identifies two Amazonian species, *Callithrix argentata* and *Callithrix humeralifer*, each with three subspecies, whereas de Vivo (1988) assigns species status to all six of these (*C.argentata*, *Callithrix chrysoleuca*, *C. humeralifera*, *Callithrix intermedia*, *Callithrix leucippe* and *Callithrix melanura*), in addition to reinstating the *emiliae* form to full species status.

Originally described as a species (Thomas, 1920), *emiliae* has been seen as a subspecies of *C. argentata* (Cruz Lima, 1944) and synonymized with *C. a. argentata* (Ávila-Pires, 1969), a classification accepted by Hershkovitz (1977), but later reverted by Ávila-Pires (1986). Having examined new specimens from Rondônia and Amazonas, de Vivo (1985, 1988) returned to the original specific status. *C. emiliae* is also accepted as a valid taxon by Mittermeier et al. (1988).

The classification of de Vivo (1988) is based on a detailed quantitative analysis of variation in pelage characteristics and craniometric dimensions. This analysis found no evidence of intergradation between any of the forms and, given their apparently allopatric distribution, concluded that they should be seen as true species. Mittermeier et al. (1988) also support de Vivo's classification, although were unable to include his complete revision in their paper. Given its thorough treatment of the available material, the taxonomic revision of de Vivo (1988) is followed here, thus the bare-eared marmosets constitute a group of four species, *C. argentata*, *C. emiliae*, *C. leucippe* and *C. melanura*.

Of the two westernmost forms, *C. emiliae* is known from widely-dispersed localities in the Brazilian states of Amazonas, Mato Grosso, Pará and Rondônia (de Vivo, 1985; Ávila-Pires, 1986) and the nature of its geographical distribution is not well understood, given its apparent discontinuity. The distribution of *C. melanura* is less fragmented (Hershkovitz, 1977; de Vivo, 1985), being restricted to Mato Grosso, eastern Bolivia and northern Paraguay. With the exception of records from Aripuanã (Fig. 1), the northernmost locality for this species is at 15°S in Mato Grosso (Vila Bela de Santíssima Trindade, 15°00'S, 57°41'W).

Considering the size of the region, records of Amazonian marmosets are relatively sparse and information is lacking from vast areas of Amazonas, Mato Grosso, Pará and Rondônia (Hershkovitz, 1977; de Vivo, 1988). During a recent field excursion to the region of Humaitá, Amazonas, a hitherto undescribed form of bare-eared marmoset was encountered in an area previously thought to be within the distribution of *C. emiliae*. This form, designated *Callithrix nigriceps*, sp.n., the black-headed marmoset, is described here.

Figure 1. Collecting localities for *Callithrix emiliae*, *Callitrhix nigriceps*, sp.n., and *Callithrix melanura* in Rondônia, Amazonas and northern Mato Grosso. 1: Calama, RO, east bank of Jiparaná River (08°03'S, 62°53'W); 2: Calama, RO, west bank of Jiparaná River (08°05'S, 62°53'W), Lago dos Reis, AM (07°32'S, 62°52'W); 4: Rio Castanho, AM, west bank of Rio Aripuanã (07°33'S, 60°20'W); 5: Aripuanã, MT (09°10'S, 60°38'); 6: Cachoeira Samuel, RO (08°45'S, 63°28W); 7: Jiparaná, RO (10°52'S, 61°57'W); 8: Nova Brasília, RO (11°09'S, 61°34'W).

Callithrix nigriceps, sp.n.

Holotype: MPEG 21998, adult male, stuffed skin, complete skeleton. Collected by S. F. Ferrari, M. A. Lopes and D. Pimentel Neto on 4 September 1990 at Lago dos Reis (7°31'S, 62°52'W, = Lago Paraíso), 17 km east of Humaitá, Amazonas, Brazil, on the Trans-Amazon Highway BR-230 (right or east bank of the Madeira River).
Paratypes: MPEG 21996, adult male collected on the 3rd of September 1990, same data as holotype; MPEG 21999, adult male collected on 5 September 1990, same data as holotype; MPEG 21997, adult female, stuffed skin, complete skeleton. Collected by S. F. Ferrari, M. A. Lopes and D. Pimentel Neto on 13 September 1990 at Calama (8°03'S, 62°53'W), Rondônia, Brazil (right or east bank of Madeira River, east of Jiparaná River).
Geographical distribution: East of the Jiparaná and Madeira Rivers. The eastern limit of the distribution is unknown, but it is probably no farther east than the Rio Aripuanã, and possibly no farther east than the dos Marmelos River.
Habitat: In common with other callitrichids, *C. nigriceps*, sp.n., is apparently abundant in marginal and disturbed forest habitats.
Diagnosis: A bare-eared marmoset of the *argentata* species group (*sensu* Hershkovitz 1977). In general appearance, *nigriceps* is similar to other bare-eared marmosets, in particular the darker forms (Fig. 2). In comparison with the geographically closest form, *emiliae*, *nigriceps* differs in the pigmentation of facial skin and ears; pheomelanization (Hershkovitz 1968) of forelimbs, mantle and ventrum; dorsum brown rather than gray; orange/russet coloration of posterior members and pale coloration of hips/upper thighs.
Description of the holotype: Face thinly haired and deeply pigmented (black *in naturae*), except for the rhinarium and supra-orbital region; pigment mottled in the inter-orbital region; facial vibrissae present; forehead and crown black; cheeks blackish to grayish brown; indistinct mantle grayish brown, hairs silvery-white basally, silvery terminally; lower dorsum drab/brown, hairs pale yellow to cream basally, silvery yellow terminally; lower flank as lower dorsum except hairs yellow to orange basally; forelimb pale orange darkening distally to brownish gray and black, hairs silvery terminally; upper surface of hand black mixed with orange or brown, lower surface hairless, unpigmented (white *in naturae*); lower surface of forelimb pale yellow to orange, darkening distally; neck and chest pale cream/silvery; ventrum yellow to orange; rump dark brown to black, hairs yellow to ochraceous to red basally, yellow/creamy distally; base of tail dark brown above, reddish brown below; tail black, hairs reddish brown distally in mid section; hips and upper thighs yellow to pale orange; upper surface of hindlimb predominantly golden orange, to russet and brown distally, hairs brown to silvery yellow distally; upper surface of foot black, mixed with golden orange, lower surface hairless and unpigmented (white *in naturae*); lower surface of hindlimb

golden orange to golden russet; scrotum hairless and unpigmented (white *in naturae*).

Paratypes: The available series exhibits a small degree of individual variation in pelage coloration (color tones) and distribution of facial pigmentation (mottling). Apart from the genitalia, no sexual dimorphism is apparent.

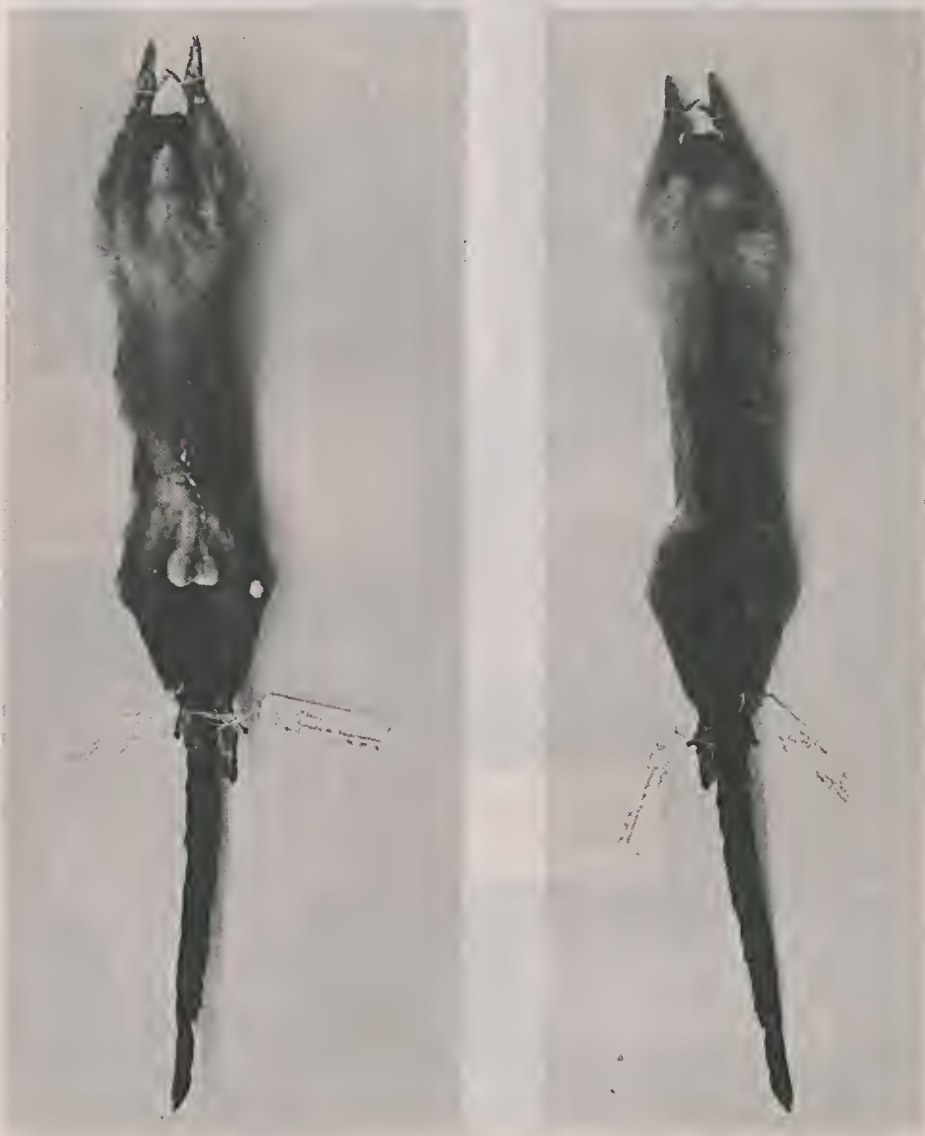



Figure 2. *Callithrix nigriceps*, sp.n., holotype (MPEG 21998).

Figure 3. Cranium and mandible of *Callithrix nigriceps*, sp.n., holotype (MPEG 21998).

MEASUREMENTS AND COMPARISONS WITH OTHER BARE-EARED MARMOSETS

External and craniometric measurements (following de Vivo 1988) for the holotype (Figs. 2 and 3) and three paratypes of *C. nigriceps*, sp.n., are presented in Tables 1 and 2. With a head/body length of approximately 20 cm, tail of 32 cm and a mean weight of 370 g, *C. nigriceps*, sp.n., is typical of the genus *Callithrix* (Hershkovitz 1977, Stevenson and Rylands 1988, de Vivo 1988). In comparison with other bare-eared marmosets (Table 3), however, *C. nigriceps*, sp.n., appears to be relatively robust, being shorter-bodied but heavier. Differences in bodily proportions between the new species and the geographically closest form, *C. emiliae*, are the most striking. This robusticity is also reflected in craniometric measurements (Table 4). Mean *C. nigriceps*, sp.n., values for four measurements (zygomatic breadth, distance across molars and across canines, and dental field) are greater than those for *C. argentata*, *C. emiliae*, *C. leucippe* or *C. melanura*, suggesting a relatively broad, robust dental arcade. The remaining values, mostly linear dimensions, fall within the range recorded for the latter four species. *C. nigriceps* is most similar to the geographically closest forms (*C. emiliae* and *C. melanura*) in some dimensions, e.g. orbital breadth and dental field, but not in others and no obvious pattern is apparent from the data.

Table 1. External measurements and weights of *Callithrix nigriceps*, sp.n., holotype and paratypes.

Variable	MPEG 21998[1]	MPEG 21999	MPEG 21996	MPEG 21997
Body weight (g)	400	330	380	390
Length (mm) of:				
Body (bregma-ischium)	193	205	220	207
Tail	314	327	320	316
Fore-arm	52	51	55	52
Foot	66	64	65	66
Ear	31	28	30	28

[1] Holotype.

The number of *C. nigriceps*, sp.n., specimens is too small to allow a detailed analysis of variability within the species group at the present time, although the available data indicate that the new species may be relatively robust in comparison with other bare-eared marmosets, and may be somewhat distinct from the geographically closest form, *C. emiliae*.

Table 2. Craniometric measumements of *Callithrix nigriceps*, sp.n., holotype and paratypes.

	Specimen:			
Measurement[1] (mm)	MPEG 21998[2]	MPEG 21999	MPEG 21996	MPEG 21997
1. Length of cranium	46.1	45.2	47.4	-
2. Condylobasal length	37.9	36.7	38.9	-
3. Zygomatic breadth	30.8	-	31.2	-
4. Braincase width	25.4	26.4	26.9	-
5. Orbital breadth	26.9	26.0	26.7	26.3
6. Across molars	17.4	15.5	16.0	15.0
7. Length of mandible	30.2	28.8	29.5	-
8. Height of articular process	15.0	14.1	14.7	15.2
9. Dental field (P_2-M_2)	11.2	11.0	10.5	11.3
10. Across canines	13.7	12.3	12.0	12.5

[1] Following de Vivo (1988)
[2] Holotype

Table 3. A comparison of mean weights and external measurements recorded for *Callithrix nigriceps*, sp.n., with values recorded for specimens of *Callithrix argentata*, *Callithrix emiliae* and *Callithrix melanura* in the Goeldi Museum collection.

Variable:	Species: *Callithrix nigriceps*	*Callithrix argentata*	*Callitrhix emiliae*	*Callitrhix melanura*
Body weight[1] (g)	370.0 (3)[2]	355.6 (14)	313.3 (12)	-
Length (mm) of:				
Body (bregma-ischium)	206.3 (4)	210.7 (30)	220.6 (16)	216.3(4)
Tail	319.3 (4)	326.7 (29)	310.9 (16)	320.0(4)
Foot	65.3 (4)	61.6 (29)	55.1 (16)	65.8(4)
Ear	29.3 (4)	27.8 (29)	27.8 (16)	25.5(4)

[1] Males only.
[2] Sample size = N.

Table 4. A comparison of the mean craniometric measurements of *Callithrix nigriceps*, sp.n., with *Callithrix argentata*, *Callithrix leucippe* and *Callithrix melanura*.

Measurement[1] (mm) / Species:

	C. nigriceps	*C. argentata*[2]	*C. argentata*[3]	*C. leucippe*[2]	*C. melanura*[2]	C. melanura[3]
1.	46.2 (3)[4]	45.7 (88)	45.4 (21)	46.1 (15)	46.8 (14)	47.3 (3)
2.	37.8 (3)	36.8 (74)	36.8 (20)	36.8 (15)	38.2 (12)	38.1 (3)
3.	31.0 (2)	30.4 (73)	29.8 (17)	30.6 (14)	30.4 (13)	30.3 (3)
4.	26.2 (3)	26.1 (83)	25.8 (22)	26.4 (16)	26.1 (14)	26.7 (3)
5.	26.5 (4)	26.2 (79)	26.1 (22)	26.3 (16)	26.7 (17)	26.5 (4)
6.	16.0 (4)	15.0 (88)	14.7 (19)	15.2 (15)	15.2 (15)	15.9 (5)
7.	29.5 (3)	28.5 (81)	27.8 (20)	28.7 (15)	28.7 (12)	29.9 (4)
8.	14.8 (4)	16.5 (71)	14.6 (20)	16.4 (14)	15.9 (7)	16.1 (5)
9.	11.0 (4)	10.1 (70)	10.2 (17)	10.1 (15)	10.3 (11)	10.7 (5)
10.	12.6 (4)	12.0 (81)	11.8 (17)	12.2 (14)	11.6 (13)	12.0 (5)

[1] Following Table 1.
[2] From de Vivo (1988).
[3] Measurements taken from specimens in the Goeldi Museum collection.
[4] Sample size = N.

DISTRIBUTION AND CONSERVATION STATUS OF THE NEW SPECIES

C. nigriceps, sp.n., is known from only two localities separated by a distance of little more than 50 km. The exact limits of its geographical distribution are thus unknown, although it is unlikely that it extends farther west than the Jiparaná/Madeira Rivers nor farther east than the Aripuanã/Roosevelt. Two *C. emiliae* collecting localities, Rio Castanho (Amazonas) and Nova Brasília (Rondônia), lie between these river systems (Fig. 1). *C. emiliae* is also known from three localities to the west of the Jiparaná, including the west bank opposite Calama. *C. chrysoleuca* occurs to the east of the Rio Aripuanã and *C. intermedia* to the east of the Roosevelt River. The only callitrichids on the west bank of the Madeira are tamarins of the genus *Saguinus* (Hershkovitz 1977, Ferrari and Lopes 1992).

Sympatry has not been recorded between any *Callithrix* species and if it is assumed that it does not occur between *C. emiliae* and *C. nigriceps*, sp.n., allopatry to the east of the Jiparaná may be determined by a second tributary of the Madeira. The most likely possibility would appear to be the Rio dos Marmelos, a relatively large river whose upper reaches coincide with an area of cerrado or savanna vegetation with extends as far south as the Jiparaná (Projeto Radam 1978). The combination of this river and the open habitat of the cerrado may constitute an effective barrier to the dispersal of callitrichids.

If this is confirmed, the natural range of *C. nigriceps*, sp.n., would be restricted to an area of little more than 10,000 km^2 between the Jiparaná/Madeira and Rio dos Marmelos. This would constitute one of the smallest ranges of any Amazonian primate species, and potentially one of the most precarious. The area can be reached by asphalted highway from Rondônia, the current focus of colonization in western Brazilian Amazonia (Fearnside 1990), and is traversed by the Trans-Amazon. Logging operations and cattle ranching have already been established along this highway, which is also used by gold prospectors working in the south of the area. While marmosets are able to adapt well to habitat disturbance in the short term, continued deforestation will eventually have a deleterious effect on the *C. nigriceps*, sp.n., population as a whole.

ACKNOWLEDGEMENTS

This study was supported by the John D. and Catherine T. MacArthur Foundation and CNPq. Specimen collection was authorized by IBAMA (special licence 1404/90-31). Special thanks are due to Dionísio Pimentel Neto and Fernando Cazarini (Projeto Rondon - Humaitá) for their assistance with the collection of material. We would also like to thank Cazuza Júnior, José Maria Cardoso, Mário de Vivo, David C. Oren, Helder Queiroz and Alexandra Krause for their help and/or advice.

REFERENCES

ÁVILA-PIRES, F.D. 1969. Taxonomia e zoogeografia do gênero *Callitrhix* Erxleben, 1777 (Primates, Callitrichidae). *Rev. Bras. Biol.* 29: 49-64.

ÁVILA-PIRES, F.D. 1986. On the validity and geographical distribution of *Callithrix argentata emiliae* Thomas, 1920 (Primates, Callitrichidae). In: *A primatologia no Brasil.* M.T. de Mello (ed). Brasília, Sociedade Brasileira de Primatologia. v.2. p.319-322.

CRUZ LIMA, E. 1944. Mamíferos da Amazônia. v. 1., Introdução geral e primatas. *Contr. Mus. Paraense Emílio Goeldi de História Natural e Etnografia, Belém, Rio de Janeiro.* viii + 273 p.

FEARNSIDE, P.M. 1990. Rondônia: Estradas que levam à devastação. *Ciência Hoje*, 11: 46-52.

FERRARI, S.F. & LOPES, M.A. 1992. New data on the distribution of primates in the region of the confluence of the Jiparaná and Madeira Rivers in Amazonas and Rondônia, Brazil. *Goeldiana Zool.* 11:1-12.

HERSHKOVITZ, P. 1968. Metachromism or the principle of evolutionary change in mammalian tegumentary colors. *Evolution*, 22: 556-575.

HERSHKOVITZ, P. 1977. *Living New World Monkeys.* v. 1., Chicago, University of Chicago Press, xvi + 1117 p.

MARTINS, E.S., SCHNEIDER, H. & LEÃO, V.F. 1987. Syntopy and troops association between *Callithrix* and *Saguinus* from Rondônia, Brazil. *Int. J. Primatol.*, 8: 527.

MITTERMEIER, R.A., RYLANDS, A.B. & COIMBRA-FILHO, A.F. 1988. Systematics: species and subspecies - an update. In: *Ecology and Behavior of Neotropical Primates*, Mittermeier, A.B. Rylands, A.F. Coimbra-Filho & G.A.B. da Fonseca (eds.). Washington D.C., World Wildlife Fund - US. v.2., p.13-75.

PROJETO RADAMBRASIL. 1978. *Levantamento de Recursos Naturais, Folha SC.20 Porto Velho.* v. 16., Ministério das Minas e Energia, Rio de Janeiro. 666 p.

STEVENSON, M.F. & RYLANDS, A.B. 1988. The marmosets, genus *Callithrix.* In: *Ecology and Behavior of Neotropical Primates*, R.A. Mittermeier, A.B. Rylands, A.F. Coimbra-Filho & G.A.B. da Fonseca (eds.). Washington D.C., World Wildlife Fund - US. v.2., p.131-222.

THOMAS,O. 1920. On mammals from the lower Amazons in the Goeldi Museum, Pará. *Ann. Mag. Nat. Hist.* 6: 266-283.

de VIVO, M. 1985. On some Monkeys from Rondônia, Brasil (Primates: Callitrichidae, Cebidae). *Pap. Avulsos Zool., São Paulo*, 36: 103-110.

de VIVO, M. 1988. Sistemática de *Callithrix* Erxleben, 1777 (Callitrichidae, Primates). Ph.D. thesis, University of São Paulo.

APPENDIX 1.

Specimens examined at the Goeldi Museum, Belém.

Callithrix argentata:

Pará: Altamira, Rio Xingu, male 166; Belterra, Rio Tapajós, males 269, 8982, 8983, 8986, 9200, 9201, 9203, 9206, 9207, 9208, 9212, 10024, 10025, 10026, 21375, 21378, 21383, 21388, females 916, 9852, 8984, 8985, 8987, 9202, 9204, 9205, 10021, 10022, 10023, 21377, 21380, 21385, 21387, sex unknown 6878; Cametá, Rio Tocantins, males 38, 151, 162, 163, 164, 165, 583, females 29, 156, sex unknown 157; Mararú, Rio Tapajós, male 154; Mojuí dos Campos, Rio Tapajós, males 13288, 13292, 13293, 21372, 21373, 21390, 21393, females 13291, 21389, 21394; Portel, female 336; Santarém, Rio Tapajós, males 918, 21384, 21391, females 328, 917, 961, 21386; Fazenda Taperinha, male 4777, sex unkown 4776; Vila São Brás, Rio Tapajós, female 21374; origin unknown, males 21381, 21382, 21392, 21414, female 21376.

Callithrix emiliae:

Pará: Maloca, Rio Curuá, male 170. Rondônia: Cachoeira Samuel, Rio Jamari, males 21365, 21366, 21646, 21660, 21886, 21887, 21888, 21890, 21894, 21896, 21897, females 21367, 21647, 21885, 21893, 21895.

Callithrix leucippe:

Origin and sex unknown: 10034

Callithrix melanura:

Mato Grosso: Cidade Humboldt, Rio Aripuanã, males 13289, 13290, 13295, 13296, 15266, 21395, female 15267.

SCT / CNPq
MUSEU PARAENSE EMÍLIO GOELDI

Campus de Pesquisa — Av. Perimetral. Guamá
Caixa Postal 399. Telex: (091) 1419. Telefones: Parque (091) 224-9233
Campus: (091) 228-2341 e 228-2162.
66.040 Belém, Pará, Brasil

GOELDIANA ZOOLOGIA é uma publicação do Departamento de Zoologia do Museu Paraense Emílio Goeldi — CNPq.

N° 1. A reevaluation of *Serpophaga araguayae* Snethlage, 1928 (Aves: Tyrannidae). José Maria Cardoso da Silva
N° 2. Notes on *Cyranotermes* Araujo, with Description of a New Species (Isoptera, Termitidae, Nasutitermitinae). Reginaldo Constantino
N° 3. *Anhangatermes macarthuri*, a New Genus and Species of Soil-feeding Nasute Termite from Amapá, Brazil (Isoptera, Termitidae, Nasutitermitinae). Reginaldo Constantino
N° 4. New and reconfirmed bird records from the state of Maranhão, Brazil. David C. Oren
N° 5. Resultados de uma excursão ornitológica à ilha de Maracá, Roraima, Brasil. José Maria Cardoso da Silva & David C. Oren
N° 6. Priority Areas for New Avian Collections in Brazilian Amazonia. David C. Oren & Haroldo Guerreiro de Albuquerque
N° 7. Notes on *Neocapritermes* Holmgren, with description of two new species form the Amazon Basin (Isoptera, Termitidae, Termitinae). Reginaldo Constantino
N° 8. *Ereymatermes rotundiceps*, new genus and species of termite from the Amazon Basin (Isoptera, Termitidae, Nasutiterminae). Reginaldo Constantino
N° 9. Aves do Estado do Maranhão, Brasil. David C. Oren
N° 10. Resumo da Classificação e Bibliografia dos Mutilídeos da América do Sul (Hymenoptera: Mutillidae). William Leslie Overal
N° 11. New Data on the Distribution of Primates in the Region of the Confluence of the Jiparaná and Madeira Rivers in Amazonas and Rondônia, Brazil. Stephen F. Ferrari & Maria Aparecida Lopes
N° 12. A New Species of Marmoset, Genus *Callithrix* Erxleben, 1777 (Callitrichidae, Primates), from Western Brazilian Amazonia. Stephen F. Ferrari & Maria A. Lopes

Este número foi publicado com o apoio de:

The John D. and Catherine T. MacArthur Foundation

&

World Wildlife Fund — US